Fermilab

Title: A Minimization Package in the Object-Oriented Style

A portion of the HEP community has perceived the need for a minimization package written in C++ and taking advantage of the Object-Oriented nature of that language. To be acceptable for HEP, such a package must at least encompass all the capabilities of Minuit. Aside from the slight plus of not relying on outside Fortran compilation, the advantages that a C++ package based on O-O design would confer over the multitude of available C++ Minuit-wrappers include: easier extensibility to different algorithms and forms of constraints; and usage modes which would not be available in the global-common-based Minuit design. An example of the latter is a job pursuing two ongoing minimization problems simultaneously.

We discuss the design of such a package, incorporating such concepts as use of the Visitor pattern to smoothly provide for cases where the user function may or may not be able to supply analytic gradients, Hessians and so forth. An existing package based on this design is presented, which extends Minuit in minor ways but which greatly diminishes the programming effort (if not the algorithm thought) needed to make more significant extensions.

-David Sachs, Walter Brown, Mark Fischler and Marc Paterno